

## CLAIMS

1. A method of correcting video data signals for addressing an active matrix display device, the device comprising a power line (10) arranged to supply current to  $n$  electroluminescent display elements (11), the current supplied to each element being controllable by a respective drive transistor (20), each drive transistor being addressable by video data signals and having an electrical characteristic parameter  $X$ , the method comprising the steps of:
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- 10 (i) – storing an  $X$  value for each drive transistor;
- (ii) – receiving a set of video data signals, each having a value  $v_d$ ;
- (iii) – determining from the stored  $X$  values and the received  $v_d$  values an expected current through the power line  $i_p$  using a model which relates the power line current to the  $v_d$  and  $X$  values of the drive transistors;
- 15 (iv) – measuring the current  $i_m$  through the power line when the drive transistors are each addressed with the received set of video data signals;
- (v) – calculating the difference  $g$  between the expected current  $i_p$  and the measured current  $i_m$ ;
- (vi) – repeating steps (ii) to (v) for at least  $n-1$  further sets of video data
- 20 signals;
- (vii) – calculating an  $X$  value for each transistor using the calculated  $g$  values;
- (viii) – replacing the stored  $X$  values with the calculated  $X$  values; and
- (ix) – correcting subsequent video data signals in accordance with the
- 25 stored  $X$  values.
2. A method according to claim 1, wherein the method further comprises the steps of:
- (x) - storing the  $g$  values in a column vector  $G$  having a length  $n$ ; and,
- 30 (xi) - performing an iterative Newton Linearisation process using vector  $G$  to obtain an  $X$  value for each transistor.

3. A method according to claim 2, wherein said Newton Linearisation process includes the steps of:

(xii) - differentiating vector G to obtain an n x n matrix G';

(xiii) - solving the equation:

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$$G'(X).\delta X = -G(X)$$

for  $\delta X$ ;

(xiv) - calculating an updated value for X for each transistor according to  $\delta X$ ;

10 (xv) - calculating updated  $g_i$  values using the updated X value; and,

(xvi) - repeating steps (xii) to (xv) until the g values are within a predetermined range around zero.

15 4. A method according to any preceding claim, wherein said sets of video data signals have predetermined values  $V_d$  to enable successful calculation of said X values in step (vii).

5. A method according to any preceding claim, wherein steps (ii) to (vii)  
20 are repeated periodically.

6. A method according to any preceding claim carried out in response to the switching on of said display device.

25 7. A method according to any preceding claim, wherein said electrical characteristic parameter X is the threshold voltage  $v_t$  of the transistor.

8. A method according claim 7, wherein said model is based upon the relationship given by the equation:

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$$i_{LED} = K(v_d - v_t)^2$$

in which  $i_{LED}$  is the current controlled by one drive transistor and K is a constant.

5 9. Apparatus for correcting video data signals for addressing an active matrix display device, the device comprising a power line (10) arranged to supply current to n electroluminescent display elements (11), the current supplied to each element being controllable by a respective drive transistor (20), each drive transistor being addressable by video data signals each  
10 having a value  $v_d$  and having an electrical characteristic parameter X, the apparatus comprising

- means (30) for storing an X value for each drive transistor;
- means for applying a model to determine an expected current through the power line using the stored X values and video data signal values  $v_d$ ;
- 15 - means (32) for measuring the current through the power line;
- means for applying an algorithm to said expected current and said measured current for a plurality of sets of video data signals to determine X values for each drive transistor;
- correction circuitry for modifying received video data signals in  
20 accordance with the stored X values.

10. An integrated circuit chip (25) comprising the apparatus according to claim 9.

25 11. An active matrix display device comprising a plurality of power lines (10), each arranged to supply current to a respective plurality of electroluminescent display elements (11), the current supplied to each element being controllable by a respective drive transistor (20), each drive transistor being addressable by respective video data signals, wherein the display  
30 device further comprises apparatus according to claim 9 for correcting video data signals supplied to said transistors associated with each power line.